DOCUMENT RESUME

ED 275 617 SO 017 734

AUTHOR Rooze, Gene E.
TITLE Strategies for Teaching Students to Process Information Using Databases.
PUB DATE Nov 86
NOTE 9p.; Paper presented at the Annual Meeting of the National Council for the Social Studies (66th, New York, NY, November 14-18, 1986).
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Development; *Computer Assisted Instruction; *Computers; *Databases; Elementary Education; *Social Studies; Teaching Methods
IDENTIFIERS *Direct Instruction; *Taba (Hilda)

ABSTRACT

The database management system or computerized database is an important tool for teaching thinking in the social studies. But what the teacher does to teach the student about databases, to use prepared databases, to organize their data, to direct their research, and to draw conclusions using this teaching device is just as important. The Direct Teaching Strategy and Hilda Taba's Concept Development and Interpretation of Data Strategies provide a structure that can help students understand prepared databases, group their own information, identify information fields, find relationships, identify cause and effect, compare and contrast data drawn from different sources, draw conclusions on data, and evaluate those conclusions. (BZ)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED275617

STRATEGIES FOR TEACHING STUDENTS TO PROCESS INFORMATION USING DATABASES

BY

GENE E. ROOZE, PH.D.

NOVEMBER 1986

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Gene E. Rooze

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

SO017734

BEST COPY AVAILABLE

Strategies for Teaching Students to Process Information Using Databases

The question of whether students should use databases or build them was introduced by Haney (1982) in his discussion of their use in science education. His concern was that prepared databases:

1. Took away some of the decision making possibilities:
   a. What data is needed?
   b. How should it be organized?
2. These decisions:
   a. Predetermine the results achieved.
   b. Insert possibilities of unchallenged error.
3. It is in the database so it must be true.

This same concern is present in the social studies and can be understood when one examines the instructional interaction model. We speak of instruction as though it were a single element, but in fact it consists of a set of teacher actions (TA), using some mediating device (M), allowing student actions (SA) which produce a resultant outcome. This idea is illustrated in the diagram below:

Content ⟶ TA + M + SA ⟶ Resultant Outcome

The important principle here is: changing any one of these components influences the outcome of learning. The selection of a mediating device (the teacher, simulation, textbook, computer database, etc.) does make a difference, the use of databases in social studies will teach a number of important skills. But the selection of this device affects both the teacher actions, the things the teacher must do in the lesson sequence; and student actions, the things youngsters must do to have success in the learning sequence. The type of interaction the student has with that instructional device affects the instructional outcome. And we must look very carefully at our intended outcomes or we may be creating an automated textbook.

Why do teachers and students use databases (Hunter 1985)

* Discover commonalities and differences among groups of

events or things.
* Analyze relationships.
* Look for trends.
* Test and refine hypotheses.
* Organize and share information.
* Keep lists up-to-date.
* Arrange information in useful ways.

What skills can we teach? (Parker 1986)

* Enter data into databases.
* Retrieve factual information.
* Use databases to organize lists.
* Determine information needed to test hypothesis.
* Reorganize and synthesize data to find relationships.
* Discriminate between relevant and irrelevant information.
* Draw logical inferences and conclusions.

*(Evaluate the conclusions we draw on the data).

What should be the steps in the process of teaching databases?

Step 1: Provide concrete model of database
Use completed index cards
Search the cards to answer questions
Step 2: Using Data Files
Exploring a file
Asking questions of the file
Step 3: Build a database
Develop form (template)
Search for data
Enter data
Step 4: Use and critique other databases

Since one of our goals in social studies is to teach students to process information, then we must create interactive environments in which students think. You will note that the interactive model discussed earlier describes the elements of such an environment.

The Direct Instruction Strategy

The most perplexing problem facing most teachers is that of teaching concepts and skills. Although much pressure has been applied to teach both skills and concepts, too little attention has been given to the strategy used to teach these elements. Direct instruction is a relatively new term that refers to academically focused, teacher-directed classrooms using sequenced, structured activities and materials (Rosenshine 1979, p. 38).

The direct instruction strategy will allow student actions which require the use learning of skills, the recall of facts or ideas. The student will be able to use these skills, facts and ideas in a similar situation. The strategy creates and interactive environment where the student is given direct instruction, provided feedback on his behavior, and given direction toward correct responses.

Rosenshine's review of the related research indicated at least five important ideas. First, teachers who most successfully promoted gains in achievement played the role of a strong leader. Second, the frequency of factual, single answer questions was positively related to gains in achievement. Third, academic focused, direct questions at the two lower levels of Bloom's cognitive taxonomy resulted in the increased acquisition of basic skills. Fourth, factual questions of the teacher question--student response--teacher feedback variety produced gains in achievement; and fifth, students made greater progress when they spent time on material and in activities which produced low error rates. These findings support the usefulness of direct instruction.

Strategy Step	Teacher Action	Student Action
1. Motivation	Presents problem, need, or discrepant event	Student attends
2. Provides Model	Presents visual or verbal model	Copies or discusses elements
3. Presents information	Explains elements of model adding information	Attends, asks for information for clarification
4. Active participation	Designs activities which require student response	Tests knowledge through participation
5. Knowledge of results	Attends to student responses	Compares behavior against model
6. Guidance	Asks questions which focus student attention on model	Responds to questions on performance

Direct Instruction Strategy

Figure 5-1

The strategy is also an organizer for teacher actions. By following these steps the instructor can teach skills and concepts required in the use of a database. The complete strategy has six steps: motivating, providing a model, imparting information, allowing active student participation, giving knowledge of results, and presenting guidance. (See Figure 1).

Perhaps the most carefully researched procedures for developing thinking skills were those devised by the late Hilda Taba, a recognized theorist and researcher in the area of school curriculum. Her research indicated that teacher behavior determines the level of thinking in the classroom. She called her first strategy, Concept Development, but it has been referred to as a classification strategy by several authors. Figure 2 has been adapted from her findings (Taba, 1967).

This strategy produces an interactive environment through teacher actions which place the student in charge of his own thinking.

Classification Strategy

Strategy Step	Teacher Actions	Student Actions
1. List information	What did you know, read, see, or hear? Encourages wide participation.	Identifies facts
2. Group Facts	What items seem to go together?	Identifies groupings
3. Explain Groupings	Why are you placing these things together?	Explains groupings of items
4. Label groups	What can you we call this group?	Places labels on grouping
5. Regroup	Is there another way we can group this information	Searches for alternative categories

Classification Strategy

Figure 2

Pon (1984) introduced database management into her fourth grade classroom using Taba's Concept Development Strategy. Using databases in the classroom encourages the type of thinking I'm discussing. Databases require a structure which must be

carefully planned in advance so that the information can be retrieved by categories, fields. The problem facing the data organizer is the formation of useful fields. Pon's first step was to have the students gather information from which categories or fields could be developed. This is the listing step and its purpose is to get information out in front of the group.

One of the problems facing the teacher using database programs is helping children organize seemingly unrelated data. The Classification Strategy discussed in this paper provides the needed information processing techniques that help children list, group, explain, label and regroup information. This strategy helps the student identify the fields which are like the items one would place on the index card. Once the students have identified these items or fields they can extend their inquiry. In the case of Pon's children's research, they were attempting to find out about other tribes of Indians in California. The next step was simply finding data which was needed to complete their forms.

One of the true values of a database management system is that it allows one to draw conclusions based on the stored data.

At this point we have allowed children to collect and store data, but the next step is to teach them to analyze the data they have stored. Here again the most carefully researched procedure for processing information was developed by the late Hilda Taba. Taba (1969) called her second strategy the Interpretation of Data. It can be used to help students find relationships, identify cause and effect, compare and contrast data drawn from different sources, draw conclusions, and formulate generalizations. Whatever the task, the same basic procedure is used.

The steps in the strategy, illustrated in Figure 3 are gathering the data, relating the facts, making and explaining inferences, and drawing conclusions.

The database management system or computerized database is an important tool for teaching thinking in the social studies. But what the teacher does to teach the student about databases, use prepared databases, organize their data, direct their research, and draw conclusions using this teaching device is important. The Direct Teaching Strategy and Hilda Taba's Concept Development and Interpretation of Data Strategies provide the structure that can help students understand prepared databases, group their own information, identify information fields, find relationships, identify cause and effect, compare and contrast data drawn from different sources, and draw conclusions on data, and evaluate those conclusions.

Strategy Step	Teacher Action	Student Action
1. Gathering information	What did you read, see, or hear?	Identifies facts
2. Relating Facts	What relationships do you see?	Identifies relationships
3. Explaining inferences	How do you explain the relationship? Why do you think that is so?	Explains relationship Justifies position
4. Drawing conclusions	What can you conclude from what's been seen?	Generalizes

Interpretation of Data

Figure 3

The database management system or computerized database is an important tool for teaching thinking in the social studies. But what the teacher does to teach the student about databases, use prepared databases, organize their data, direct their research, and draw conclusions using this teaching device is important. The Direct Teaching Strategy and Hilda Taba's Concept Development and Interpretation of Data Strategies provide the structure that can help students understand prepared databases, group their own information, identify information fields, find relationships, identify cause and effect, compare and contrast data drawn from different sources, and draw conclusions on data, and evaluate those conclusions.

References

Haney, Michael R. "The Computer in Science Education: Defining the Role of Technology." The Computing Teacher, 9 (1982): 32-35.

Hunter, Beverly. "The Case for a Classroom Database." Instructor 94 (March 1985): 54-58.

Hunter, Beverly. "Problem Solving with Data Bases." The Computing Teacher 12 (May 1985): 20-27.

Parker, Janet. "Tools for Thought." The Computing Teacher. 14 (October 1986): 21-23.

Pon, Kathy. "Databasing in the Elementary (and Secondary) Classroom." The Computing Teacher 12 (November 1984): 28-30.

Rooze, Gene E. "A Strategy for Helping Students Draw Conclusions Using Computerized Databases." The Social Studies 77 (March/April 1986): 74-76.

Rooze, Gene E. and Northup, Terry. Using Computers to Teach Social Studies. Littleton, Colorado: Libraries Unlimited, Inc., 1986.

Rosenshine, Barak V. "Content, Time, and Direct Teaching." In Research on Teaching: Concepts, Findings, and Implications, edited by Penelope L. Peterson and Herbert J. Walberg. Berkley, California: McCutchan Publishing Corporation, 1979.

Taba, Hilda. "Implementing Thinking as an Objective in Social Studies. In Effective Thinking in the Social Studies, edited by Jean Fair and Fannie R Shaftel. Washington, D.C.: The National Council, 1967.